Minden District Fisheries Management Plan:

Background Information and Options

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Ontario

Ministry of Natural Resources

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INTRODUCTION

1. Purpose

This background document presents a summary of fisheries resource information and management options for public review. Following this review process a Fisheries Management Plan will be developed. The Fisheries Management Plan will identify both long term fisheries management direction (year 2000) and specific short term (5 year) fisheries management programs to be carried out within Minden District.

This document encompasses the entire 4745 square km. under the jurisdiction of the Minden District Office of the Ontario Ministry of Natural Resources, with the exception of approximately 190 square km. administered by the Leslie M. Frost Natural Resources Centre. The McRae addition (67 square km.) in the northeast corner of Eyre township purchased by the crown in 1967 for addition to Algonquin Park is currently being managed by Minden District. Until the ultimate status of this area is determined, fisheries programs will be consistent with management throughout the District. However the fisheries of the McRae addition will not be included within the context of this plan.

2. Planning Process

The District land use planning process coordinates the Ministry's land and water programs at a broad level, outlining Ministry of Natural Resources intentions to provide optimum use of the resources with a minimum of conflict to achieve established objectives. The District Land Use Guidelines follow this direction and in turn provide targets and direction for individual resource management plans.

Optional management strategies and tactics are presented in this document. All strategies have been prepared within the context of Strategic Planning for Ontario Fisheries (S.P.O.F.) principles and in full recognition of other users of the District resource base. Other services of the Ministry of Natural Resources have been given the opportunity to review and comment upon this document, and have provided input in areas where the Fisheries Management Plan may affect their programs.

3. Detailed Background Reports

A detailed background report and analysis (O.M.N.R., 1985), which forms the basis for the management direction described in this plan has been prepared. This supporting document is available for review at the Minden District office and includes information regarding:

- The Resource
- Resource Use and Projections
- Target Testing
- Problems and Issues
- Present Management Practices
- Identification and Evaluation of Optional Management Strategies and Tactics.

BACKGROUND INFORMATION

1. Perspective

The Minden District is one of six administrative Districts within the Algonquin Region, (Figure 1). Minden District, (Figure 2), is located in the transition zone between the Southern Lowlands and the Canadian Shield. The

FIGURE 1:

REGIONAL SETTING

MINDEN DISTRICT
ALGONQUIN REGION

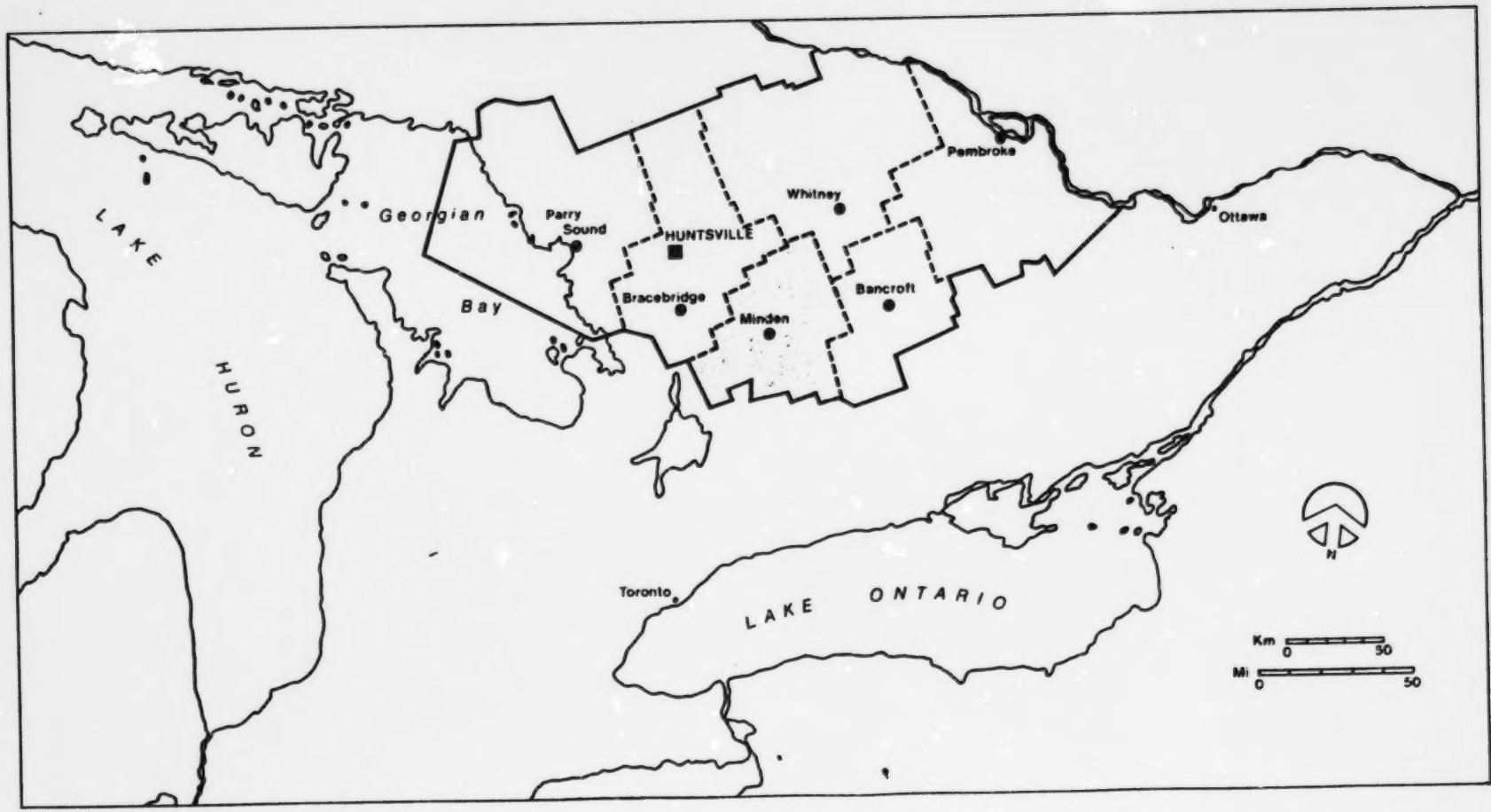

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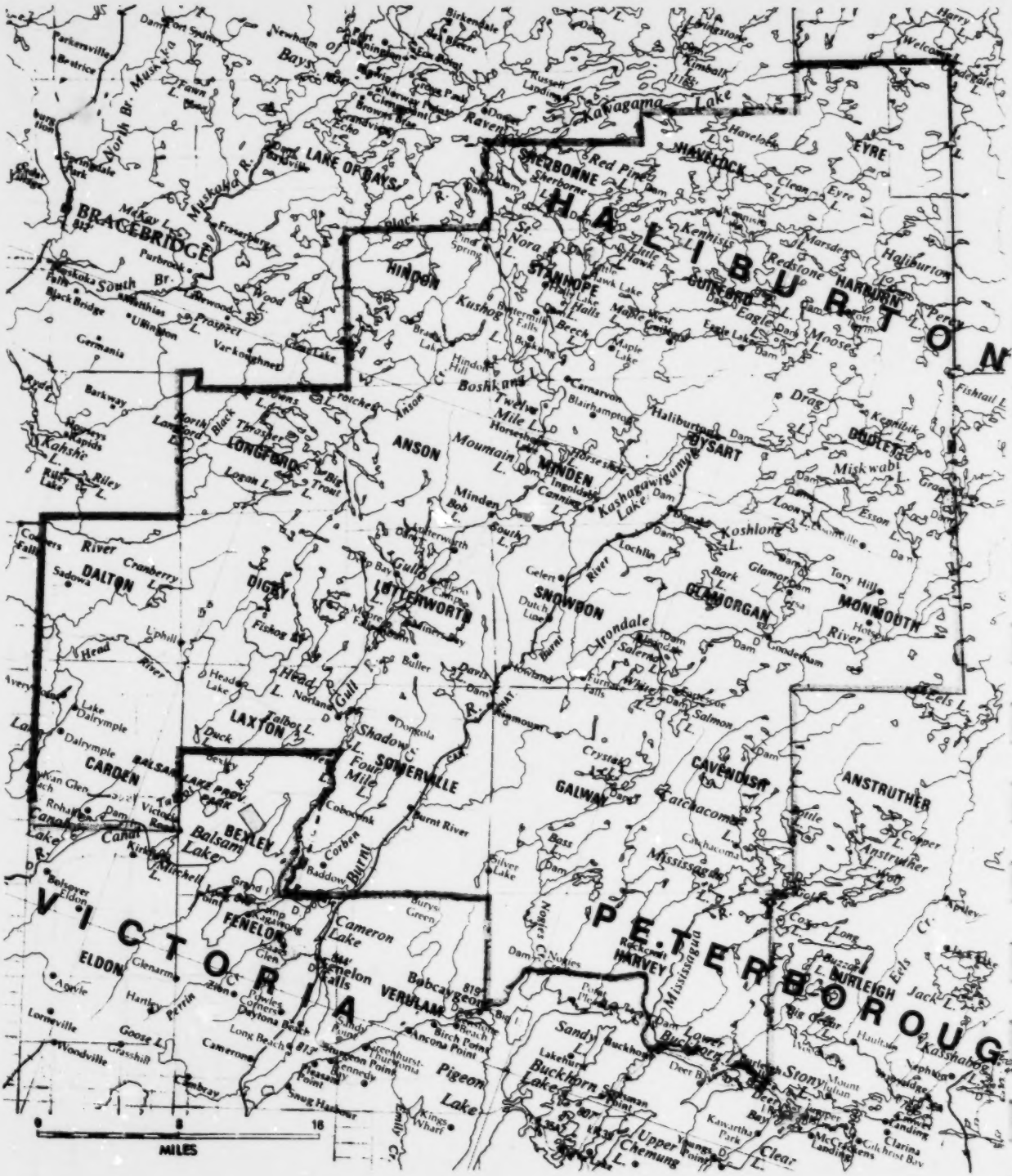
FIGURE 2:

MINDEN
ADMINISTRATIVE DISTRICT
ALGONQUIN REGION



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north-east two thirds of the District is underlain by granitic bedrock, with the remaining one third almost entirely limestone plain.

The shield portion of the District is typical of mid-central Ontario with numerous lakes, rivers, streams and beaver ponds. The larger shield lakes, 100 to 1400 ha in size, are typical oligotrophic lake trout-bass waters. The smaller shield lakes are predominantly bass and/or stocked brook or rainbow trout waters.

The limestone plains of the south-eastern one third of the District contain fewer lakes than the shield and in general, lakes are large and shallow. These lakes are mesotrophic to eutrophic and support warmwater fisheries for bass, muskellunge and walleye (yellow pickerel).

Extensive historic fish stocking of warm water species from the 1920's to present, particularily smallmouth and largemouth bass, muskellunge and walleye, have resulted in major establishments of these species throughout the District. Many of these warmwater species have been introducted into the oligotrophic (trout) waters on the Shield.

Fish stocking of lake, brook, and rainbow trout has been extensive within the District, since the 1920's.

Approximately 90% of all lake trout lakes in the District have been stocked in the past. Almost all brook and rainbow trout lakes are maintained via stocking, (artificial fisheries).

The proximity of the District to highly populated Southern Ontario, and the abundance of hundreds of high quality lakes have resulted in Minden District becoming a major summer and winter recreation area. Private cottage and commercial tourist resort development is extensive throughout the District.

Tourism and cottaging is considered the most important aspect of the District's economy.

2. The Resource

. Figure 3 (back cover pocket) is a map of the District's fisheries resource base

. Figures 4, 5, 6, and 7 (appendix) are maps providing resource base information on location of dams, land tenure, resource access, and baitfish blocks.

. Minden District Area (excluding Frost Centre) - 4555km^2
. Crown Land - 29%
. Patent (Private) Land - 71%
. Number of Lakes - 1322
. Total Surface Area of Lakes - 35,863 ha.
. Total Potential Fish Yield from all Lakes - 157,334 kg/yr.
. 100% of fish production is available to the sport fisheries, since there is no commercial food fishery within the Minden District.

A summary of resource production by game species is presented in Table 1.

TABLE 1: Partitioning of Fish Yield to Individual Game Fish Species

Species	No. of Lakes	Water Surface Area (ha)	Allowable Harvest (kg/yr)	% of Total Allowable Harvest
Lake Trout	73	18,872.6	10,100.5	9.9
Brook Trout	44	905.1	2,390.9	2.3
Rainbow Trout	28	914.9	2,269.6	2.2
Lake Whitefish	23	7,728.7	5,158.3	5.1
Round Whitefish	1	1.193.9	579.0	0.6
Lake Herring	26	9,114.7	2,217.2	2.2
Northern Pike	2	1,426.8	2,605.0	2.6
Muskellunge*	38	6,969.5	8,835.6	8.7
Smallmouth Bass	225	22,937.4	45,634.5	44.8
Largemouth Bass	57	11,560.7	12,740.3	12.5
Walleye (Yellow Pickerel)	21	5,441.6	9,378.5	9.2
TOTAL			101,909.4	100

- Allowable harvest represents the best estimate of game fish annually available to the angler while allowing for maintenance of fish stocks. Because of this allowance for stock maintenance and the fact that several non-game fish species (ie not actively sought by Minden District anglers) such as perch, pan fish, etc. exist in District lakes, the total allowable harvest (101,909.4 kg/yr.) is 55,424.6 kg/yr. less than the total potential fish yield. (157,334.0 kg/yr.)

- Length of streams and rivers -2415 km.

- Total potential fish yield from streams and rivers - unknown (estimated as less than 2% of the District total)

- Total potential Baitfish Yield - unknown

*Allowable harvest of muskellunge was calculated using northern pike criterion, however this is very likely an overestimate. Once better muskellunge production information is available refinement of this data will occur.

3. Resource Use

Sportfishing

Minden District currently provides an estimated 358,200 game fish species angling opportunities annually, (one angling opportunity is the equivalent of four man-hours fishing). This estimate is the best available, utilizing a 1980 Lakeshore Capacity Study, Fisheries Assessment Unit data and District creel census information. Other fish species such as perch, ling, suckers, smelt, panfish, etc. provide many thousands of additional angling opportunities annually; however, specific estimates for these species are unavailable. In addition stream and river fisheries provide many added angling opportunities (11 streams and rivers have been stocked with brook or rainbow trout) however, again, no specific estimates are available. A summary of current resource use is provided in Table 2.

Lake trout are the most sought after game species in Minden District, followed by bass (smallmouth and largemouth), brook and rainbow trout, walleye, whitefish/herring, and muskellunge/northern pike.

A majority of angler effort for coldwater species occurs during winter and spring when local residents and day-trip anglers predominate. (McCombie, 1980). Generally, the summer fisheries for all species has greater participation by cottage owners. day trippers from southern Ontario, and commercial guests. Lake trout harvest is split equally between "ice" and "open-water" fishing. (McCombie, 1982). The 1980 Provincial Angler Survey estimates a small proportion (only 6%) of anglers in Minden District reside outside the Province of Ontario.

Although there are no accurate estimates a relatively small proportion of anglers utilize the services of commercial outfitters.

Commercial Fish

There is, at present, no commercial food - fish netting industry within Minden District. To date there are two commercial fishing preserve operators and two commercial hatcheries licensed to propogate and sell trout and bass.

Baitfish

There are currently 29 licensed baitfish harvesters and 43 establishments licensed to sell baitfish within Minden District. A majority of the District is currently under licence. Annual returns indicate fluctuations in harvest of between 20,000 and 50,000 dozen with estimated gross values of 20,000 - 40,000 dollars.

4. Projected Resource Use - Year 2000

Sportfishing

Demand for angler opportunities is expected to increase by 15% for the year 2000 to approximately 412,000 angler opportunities, with angler

TABLE 2: Current Annual Opportunities, Harvest and Angler Success Minden District

Species	Estimated Opportunities	% of Total	Angler Success kg/opp	Current* Harvest Kg.	% of Total	Exploitation** Level
Lake Trout[1]	140,035	39.1	0.25	34,914	32.3	3.46
Brook Trout[2]	67,819	18.9	0.28	18,989	17.6	1.00
Rainbow Trout[2]	33,583	9.4	0.18	6,093	5.6	1.00
Whitefish/Herring[3]	1,340	0.4	0.2	268	0.2	0.04
Smallmouth & Largemouth Bass[1]	107,235	29.9	0.4	42,892	39.7	0.74
Muskellunge/Pike[1]	976	0.3	1.5	1,464	1.4	0.17***
Walleye[4]	7,212	2.0	0.4	3,101	2.9	0.33
Yellow Perch & other species	?	?	?	?	?	?
TOTALS	358,200		0.3	107,990		

NOTE

1. Based on McCombies 1980 Lakeshore Capacity Study. (L.C.S.)
2. Brook and Rainbow Trout opportunities based on 1975 Provincial Angler Survey with a correction factor applied (value assumed to be equal to factor calculated for lake trout), and angler success based on 1964-1981 District Creel Data.
3. Whitefish data based on Haliburton Hastings Assessment Unit, Twelve Mile Lake Harvest of 0.03 kg/ha.
4. Walleye, using McCombies 1976 L.C.S. Computer Printouts for Four Mile and Dalrymple Lakes.

* Current Harvest = (Estimated Opportunities) x (Angler Success)

** Exploitation level is Current Harvest (see above) divided by the Allowable Harvest (see Table 3).

*** Allowable harvest of muskellunge was calculated using northern pike criterion, however this is very likely an overestimate, (see note Table 1)

TABLE 3: Anticipated Demand For Year 2000 and Allowable Harvest

SPECIES	Anticipated Opportunities	Prov. Angler Success Standard	Anticipated Harvest[1] kg.	Allowable Harvest	Exploitation Level[4]
Lake Trout	161,000	0.2	32,200	10,100	3.19
Brook Trout, Rainbow Trout, and Splake[2]	117,000	0.2	23,400	23,400	1.0[3]
Whitefish/Herring	1,541	0.2	308	7,950	0.04
Small & Largemouth Bass	123,000	0.5	61,500	58,375	1.05
Muskellunge/Pike*	1,100	0.5	500	11,440	0.05
Walleye	8,300	0.5	4,150	9,380	0.44
Total All Game Species	411,900		122,108	120,645	1.01

NOTE:
1. Anticipated harvest = (Anticipated Opportunities) x (Provincial Angler Success Standard)
2. Splake have just been introduced into the District and have not yet made a significant contribution to the fishery
3. Brook and rainbow trout allowable harvest assumed equal to anticipated harvest, since these fisheries are strictly artificial, maintained by stocking.
4. Exploitation level = (Anticipated Harvest) divided by (Allowable Harvest)

*Allowable harvest of muskellunge was calculated using northern pike criterion, however this is very likely an overestimate, (see note Table 1).

preference and quality of experience remaining constant.

Anticipated harvest is based on projected demand for angler opportunities and provincial angler success standards of 0.2 kg fish per angler opportunity for coldwater species and 0.5 kg fish per angler opportunity for warmwater species. These quality standards are similar to present success rates in Minden District (see Tables 2 and 3).

Baitfish

It is reasonable that as the demand for sport fishing opportunities increases so will the demand for baitfish. Although no accurate inventory data exists, the baitfish resource in the Minden District is thought to have the potential to support an increased industry.

5. Problems and Issues

If the demand for sportfish is to be met there are several fisheries management concerns that must be dealt with.

The primary concerns are habitat loss, overharvest of lake trout, a large number of District lakes not presently supporting game fish species, a dependence on artificial coldwater fisheries, the introduction of competitor species, water level fluctuations, acid precipitation, access to the resource, a projected overharvest of bass, loss of lake whitefish, resource user conflicts, and a need for more effective communications.

A more detailed description of these issues, quantifying the degree of the problem within Minden District follows:

(i) Habitat Loss

Habitat loss includes both the physical habitat (spawning beds, nursery areas, etc.) and the deterioration of water quality (eg. oxygen levels), reducing the area available to particular species.

Physical Habitat

- 25% of District lake trout lakes have highly developed shorelines (greater that 10 cottages per km. of shoreline) and 50% have moderately developed shorelines with 5-10 cottages per km of shoreline.
- generally, development is less intense on warmwater lakes, and minimal on brook and rainbow trout lakes. This is a reflection of lake size, accessability, and poor shoreline potential for cottaging (eg. marsh, etc.).

Eutrophication (reduction of water quality)

- 25% of District lake trout lakes suffer from oxygen depletion in the deep waters and are thus sensitive to additional development.
- greater than 40% of the septic systems examined on 2 Minden District lakes by the Ministry of Environment in 1984 were found to be seriously substandard.

- at present, the water quality of warmwater lakes is not considered to be threatened by development.
- generally, the brook and rainbow trout lakes exhibit late summer oxygen depletion in the lower levels, hence would be sensitive to intensive development, however to date these lakes are relatively undeveloped.

Causes:

- dock and retaining wall construction in littoral zones without prior approval.
- removal of spawning rubble to create retaining walls and beach areas.
- enhancement of swimming areas through dredging, filling, and aquatic vegetation removal.
- nutrient leaching (eutrophication) from septic systems and increased ground surface run-off.
- a general lack of appreciation by the public of fisheries habitat values and potential for development impacts.

(ii) Overharvest of Lake Trout

The present angler harvest of lake trout exceeds allowable harvest (recruitment) by more than 3 times (Table 2). This may result in a reduction of native lake trout and increased reliance upon stocked fish, or possible fish community imbalance with an increase in non-target species as the top-level predators (lake trout) are removed.

Causes:

- angler preference is for lake trout (39% of angler effort), yet lake trout represents only 8.4% of the allowable harvest of game fish species (Table 3).
- relative ease of access to most lake trout lakes.

(iii) Large Number of Lakes Presently Not Supporting Game Fish Species, or for Which Complete Inventory Data is Unavailable.

Approximately 1000 lakes in Minden district fall into this category. These lakes are small in nature, however collectively could contribute significantly to District game fish production. This production potential is predominantly in warmwater species, (eg. bass).

Causes:

- given current manpower it is impossible to complete lake surveys on all District lakes to determine their individual abilities to support game fish species.

(iv) **Dependence Upon Stocked (Artificial) Trout Fisheries to Meet Angler Demand**

Currently approximately 41% of the District angling opportunities depend upon continued trout stocking. A majority of the brook trout, all of the rainbow trout and approximately 33% of the lake trout caught are stocked fish.

This dependance has created a false public perception that stocking solves all problers. In addition are the associated genetic quality, and disease concerns as well as the high cost of stocking.

Causes:

- high demand for trout species.
- a highly successful trout stocking program created further demand for artificial coldwater fisheries.
- high public acceptance of fish stocking program.

(v) Invasion of Competitor Species

Rock bass, smelt, perch, and in brook and rainbow trout waters, smallmouth bass, all compete both directly and indirectly with game fish species for food and habitat, and prey upon young-of-the-year game fish.

The spread of competitor species through the district has been rapid. In the last few years rock bass have become abundant in over 90% of the District's lake trout lakes.

Causes:

- angler use of illegal bait species.
- illegal introduction of game fish species (ie) bass, pike, etc.
- a general lack of appreciation of the impact of these competitor species.

(vi) Water Level Fluctuations

There are 79 dams in Minden District (Figure 4). Water level fluctuations resulting from the operation of these dams directly effect 85.5% of the total lake trout lake area within the District. Impacts to lake trout can be severe. Exposure of unhatched eggs, insufficient wave-action cleaning of spawning shoals, and the instability of littoral zones may all result from these fluctuations.

Generally, water level fluctuations do not seriously impact brook trout, rainbow trout, or warmwater fisheries in Minden District.

Causes:

- Haliburton County lakes act as reservoirs for control of water levels in the Trent-Severn Waterway.
- conflicts arise between users (ie.) boaters and cottagers versus anglers.
- the timing of fall drawdowns is critical.

(vii) Acid Precipitation

Of 150 lakes rated in Minden district, 1 (0.7%) is classified as acidified, and 32 (21.3%) are classified as extremely sensitive, to acidification. Acid precipitation has the potential to increase egg and fry mortality in spring-hatching fish species, can increase the physiological stress on all fish species, and may lead to the release of heavy metals from sediment layers.

Causes:

- average precipitation in the Haliburton Highlands is acidic, with a pH of 4.3.
- the bedrock and soils found in the northern two-thirds of the District have a very limited buffering capacity (ie.) granitic.
- spring acid pulse (snowmelt) results in a large influx of depressed pH water at once.

(viii) Limited Access To The Fisheries Resource

Approximately 17% of the Districts annual fisheries production occurs in lakes on private property which are relatively inaccessible to the general public. Sixty-five percent of the total brook trout and 18% of the total rainbow trout production occurs on lakes completely surrounded by private land.

At present, agreements exist allowing public access to the lakes stocked by the District. However access may be closed by the landowner at any time, resulting in the loss of that lakes annual sport fish production to the public.

Causes:

- 71% of the District is private land, (Figure 5).
- conflicts between landowners and resource users (ie.) littering, destruction of private property, etc. This results primarily from the publics unawareness of the access status of many lakes, and the potential for access to be closed by landowners.

(ix) Projected High Demand for Bass (Smallmouth and Largemouth)

By the year 2000 it is anticipated that bass will be harvested at, or slightly beyond the allowable harvest level. If additional bass fisheries are not established an overharvest situation resulting in reduced angler success and/or bass production could occur.

Causes:

- Bass are a highly desirable game species, generally accounting for 30% of total angler effort.
- With the relatively high angler success rates and the availability of bass, the proportion of anglers seeking bass is expected to increase.

(x) Loss of Whitefish Fisheries

The majority of whitefish fisheries are declining in the District.

Causes:

- uncertain at the present time, however it is suspected that the introduction of smelt is a major factor in the decline of these whitefish populations.

(xi) Resource User Conflicts

Potentially the three main issues arising due to differing user-group priorities are:

(1) Economic benefits of shoreline development versus water quality and long term economic concerns versus maintenance of the fisheries resource and angling recreation benefits.

(2) Water level controls: flood control and navigation versus recreation versus fisheries management.

(3) Forestry and mineral extraction practices versus maintenance of the fisheries resource and angling recreation benefits.

These conflicts all serve to compound problems discussed in this section. When selecting appropriate management actions these conflicts must be considered.

(xii) Need for Additional Inventory Data

A large number of lakes remain unsurveyed, no streams have been surveyed to date, the location of many lake trout spawning beds is unkown, the extent of naturally reproducing brook trout is unknown, many critical habitats such as nursery and spawning areas remains undocumented, and allowable harvest of baitfish is unknown.

Causes:

- a large number of waterbodies to manage, and a diversity of fish species and stresses acting on the fisheries.
- limited manpower.

(xiii) Need for Effective Public Education

For the effective management of the fisheries resource public insight and appreciation for all of the problems discussed in this section is necessary.

6. Present Management

The current Minden District Fisheries Management Program consists of Enforcement, Regulatory Control, Habitat Inventory, Habitat Rehabilitation, Habitat Protection, Fish Population Assessment, Fish Stocking, Fisheries Extension and Baitfish Harvest Management.

7. Development of Targets

The broad fisheries management objective of the Ministry is, "to protect, rehabilitate, enhance, and maintain fish communities and their environment to provide an optimum contribution of fish, fishing opportunities, and associated benefits to society".

This broad objective as approved in the District Land Use Guidelines illustrates the direction for fisheries management in Minden District. To provide optimum recreation benefits the fisheries resource will be managed so as to meet the demands for desired fish species, wherever applicable on a self-sustained, balanced community basis. Specific objectives and targets have been developed to direct management effort to enable the Ministry to meet demands placed upon the fishery. These objectives and targets reflect provincial interests, and have been refined, consistent with the capability of the local resource and the demands of user groups.

Completion of analysis of the fisheries resource data illustrated the need to refine District Land Use Guidelines targets to more realistically reflect the productivity of the resource.

In addition, the sport fish objective was divided into seven targets to provide for better management of lake trout, other trout species, whitefish/herring, bass, muskellunge, walleye and other fish species. Table 4 provides a summary of the target refining process. An objective for baitfish has been developed, however, due to lack of available inventory data no specific target has been established.

TABLE 4: DEVELOPMENT OF TARGETS

SPECIES	CURRENT USE		DISTRICT LAND USE GUIDELINES TARGETS[1]		PROJECTED USE[2]		CURRENT RESOURCE CAPABILITY[2]		FINAL TARGET[3]	
	Opp.	Kg.	Opp.	Kg.	Opp.	Kg.	Opp.	Kg.	Opp.	Kg.
Lake Trout	140,035	34,914	98,000	8,400	161,000	32,200	50,500	10,100	50,500	10,100
Brook, Rainbow Trout, & Splake	101,402	25,082	98,000	8,400	117,000	23,400	117,000	23,400	117,000	23,400
Whitefish & Herring	1,340	268	?	?	1,500	300	39,750	7,950	39,750	7,950
Smallmouth & Largemouth Bass	107,235	42,892			123,000	61,500	116,750	58,375	123,000	61,500
Muskellunge & Pike	976	1,464	1,204,000	103,200	1,100	600	22,880	11,440	22,880	11,440
Walleye	7,212	3,101			8,300	4,200	18,760	9,380	18,760	9,380
Perch & Other Species	?	?	?	?	?	?	?	?	40,050	?
TOTAL	358,200	107,990	1,400,000	120,000	411,900	122,108	365,640	120,645	411,900	123,770

1 - Quality standard of catch all species.0 86 kg/opportunity
2 - Provinicial quality standards of 0.2 kg/opportunity coldwater species, 0.5 kg/opportunity warmwater species
3 - refer to species specific targets.

Sportfish Objective:

To maintain opportunities for a diversified angling experience, meeting future angler demand, within the limits of sustained yield management.

Targets: (Year 2000) (see Table 4)

Lake Trout - To maintain production at potential, yielding 10,100 kg/yr of lake trout and providing 50,500 angling opportunities (31.4 % of projected demand) with an average angler success rate of 0.2 kg per opportunity.

Other Trout - To provide 117,000 angling opportunities with an average success rate of 0.2 kg per opportunity through the use of artifical (put-and-take) brook trout, rainbow trout, and splake fisheries.

Whitefish/Herring - To maintain production at potential, yielding 7,950 kg/yr, and potentially providing 39,750 angling opportunities with an average success rate of 0.2 kg per opportunity, thereby exceeding demand and providing for increased angler opportunities.

Bass - To provide, at a minimum, a yield of 61,500 kg/yr, providing 123,000 angling opportunities with an average angler success rate of 0.5 kg per opportunity, through the expansion of bass into barren waters, thereby meeting or exceeding demand for bass.

Muskellunge - To maintain production at potential, yielding 11,440 kg/yr and potentially providing 22,880 angling opportunities with an average success rate of 0.5 kg per opportunity, thereby exceeding demand and providing for increased angler opportunities.

Walleye (Yellow Pickerel) - To maintain production at potential yielding 9380 kg/yr and potentially providing 18,760 angling opportunities with an average success rate of 0.5 kg per opportunity, thereby exceeding demand and providing for increased angler opportunities.

Other Species (perch, ling, suckers, carp, smelt, pumpkinseeds, rock bass, etc) - To provide, at a minimum, 40,050 angling opportunities, encouraging utilization of those species, and meeting the overall objective, for future angler demand.

Separate targets have been designed to highlight the role of each component of the sports fishery, however these targets are not independant, in that <u>all</u> must be met to accomplish the sportfish objective, (Table 5).

Baitfish Objective and Target:

To manage baitfish to ensure socio-economic benefits and the maintenance of stable fish communities.

The baitfish industry is expected to increase at a rate proportional to the increase in sport fisheries. Management effort will be placed upon determining allowable harvest figures and encouraging wise use of the baitfish resources.

TABLE 5: Resource Base Targets VS Demand

	1 Target Opportunites	2 Anticipated Demand	Difference 1 - 2
Lake trout	50,500	161,000	- 110,500
Brook and Rainbow Trout	117,000	117,000	0
Whitefish/Herring	39,750	1,540	+ 38,210
Bass (Smallmouth and Largemouth)	123,000	123,000	0
Walleye	18,760	8,300	+ 10,460
Muskellunge/Pike	22,880	1,100	+ 21,780
Other Species (Perch etc.)	?	?	?
Total	371,890	411,940	- 40,050

*NOTE: Target opportunities equal the allowable species harvest at the Provincial Quality Standard (see Table 3)

8. Priorities

Given the importance of the lake trout fisheries, and the number of stresses acting upon this fisheries, lake trout are given top priority in Minden District.

Other trout species (brook trout, rainbow trout, and splake) are also in high demand and form the basis of the artificial fish stocking program. Bass (smallmouth and largemouth) are also very important to the District fishery, providing the largest single production and it is projected that by year 2000, demand will exceed current supply.

Other game fish species (whitefish/herring, muskellunge and walleye) are important components of the District fishery, however, projections indicate an underutilization of these species. Therefore these have a lower priority in the Minden District.

9. Target Rationale

Perch, rock bass, suckers, etc., are underutilized by Minden District anglers and often compete with other fish species. Management effort will be to encourage utilization of these species, providing the angler opportunities necessary to meet overall angler demand.

The current yield (present production) of walleye, muskellunge, and whitefish/herring exceeds projected future demands for these species. Management action will concentrate on maintaining existing yields providing for increased angler opportunities and/or increased angler success rates for these species. Whitefish and herring are similar species, and lack of data makes it impossible to separate these. However, District whitefish populations are in a state of decline and the potential for expanding fisheries lies with herring.

Projected angler demand for bass exceeds present supply. Management effort will be directed towards increasing bass production through the establishment of bass fisheries in presently barren waters.

Brook and rainbow trout are artificial fisheries, totally supported by fish stocking, hence allowable harvest is equal to angler harvest. However, the potential for expansion of these fisheries is minimal, and these fisheries are heavily stressed, primarily due to the introduction of competitor species (ie. perch, rock bass, etc.). Management effort will be directed to maintaining and/or expanding existing brook and rainbow trout fisheries.

Splake are a recent introduction to Minden District. It has been shown experimentally that splake in inland waters have higher survival and growth rates than brook or rainbow trout when stocked in lakes with competitor species. Splake have extended life spans (16 years plus) and grow to sizes of 5 kg. or more. Management effort will be to establish put-and-take splake fisheries in brook and rainbow trout lakes containing competitor species. Splake will also be introduced into other suitable underproducing waters in order to provide a viable angler alternative to lake trout.

Present harvest of lake trout exceeds potential supply by more than 3 times. Management effort will be directed at maintaining or expanding lake trout yield and reducing the angler harvest to the level of resource capability.

In order to reduce angler harvest it will be necessary to shift angler pressure to other fish species.

It is expected that if current fisheries management effort is properly directed targets can be met.

OPTIONAL MANAGEMENT STRATEGIES AND TACTICS

1. Introduction

To satisfy targets, optional management strategies which address the Problems and Issues identified earlier are presented. Optional management tactics (actions) formulated to achieve strategies are listed. Only those tactics that are technically, economically and socially acceptable are considered. A basic analysis of each tactic is available in the detailed background document. Tactics are not necessarily limited to those listed here. The identification of new and innovative ways to accomplish strategies is an ongoing process, and when better tactics are identified they will be utilized. Emergency situations such as storm related damage to spawning areas will arise, and cannot be planned for. These situations will be dealt with in a manner consistent with priorities identified in this plan.

2. Strategies and Tactics

Strategy: Assessment/Inventory

To evaluate the effectiveness of fisheries management programs it is necessary to monitor the resource status and its reponse over time to management action.

Tactics:

- Establish a district "type" lake system
- Creel census (resource user survey)
- Water chemistry updates
- Stream survey
- Lake survey
- Identify barren/underproducing waters suitable for warm water

species introductions and/or trout stocking
- Critical habitat evaluation
- Sonic tagging of lake trout to identify lake trout spawning areas
- Identify extent and degree of water level fluctuation impact on existing lake trout fisheries
- Fish stocking assessment
- Fish contaminant level monitoring
- Monitor habitat quality (ie.) acidification, susceptability to development, etc.
- Stream habitat rehabilitation assessment

Strategy: Reduce the overharvest of naturally reproducing lake trout populations

Tactics:

- Conduct a user survey to determine the most acceptable and effective means to reduce lake trout overharvest
- Assess the reproductive status of existing lake trout fisheries
- Regulatory control (ie.) season closure, creel limits, size limits, gear restrictions
- Stocking to create additional artificial lake trout, splake, brook trout, and rainbow trout fisheries as alternatives to native lake trout
- Encourage utilization of underharvested species (eg. walleye, whitefish/herring, perch, panfish, etc.)
- Introduction and establishment of self-sustaining warmwater fisheries (bass, muskellunge, walleye) to underproducing waters to create high quality warmwater fisheries as alternatives to lake trout- Improve access to underutilized fisheries
- Promote research into, and angler compliance with a catch-and-release lake trout program

Strategy: To minimize the impact of development on the District's fisheries including both the physical loss of habitat and reduction of water quality

Tactics:

- Review of both internal plans (timber, road proposals, parks development, etc.) and external plans (dredging, filling, mining, severance, subdivision, etc.) to protect significant fisheries habitat (as per Federal Fisheries Act)
- Ensure protection of fisheries habitat through the implementation of the Modified Management Area System, as described in the District Land Use Guidelines
- Implement a staff training program regarding the identification and importance of significant fisheries habitat, potential development impacts, and enforcement of relevant acts and regulations (Lakes and Rivers Improvement Act, Federal Fisheries Act, Beach Protection Act, Public Lands Act, etc.)
- Provide public education stressing the importance of various habitat types, and the impact shoreline development has, identifying the need for a review of all proposed shoreline alterations (retaining walls, dredging, filling, clearing of shoreline and addition of sand)
- Develop a joint Ministry of Environment, Ministry of Natural Resources District Strategy regarding policies for shoreline development
- Rehabilitate degraded significant fisheries habitat (spawning bed improvement, brush piles for bass, etc.)

- Investigate point source pollution complaints

Strategy: To utilize the fisheries production potential in presently barren/underproducing waters

Tactics:

- Introduction of warm water fish species (bass, walleye, muskellunge) to create self sustaining fisheries in all suitable waters
- Stock rainbow trout, brook trout, lake trout and/or splake to create put-and-take trout angling opportunities in all suitable barren/underproducing waters
- Introduce and establish or re-establish, self-sustaining lake trout populations
- Provide fisheries expertise and encourage establishment of sports fisheries in private waters

Strategy: To place into perspective the importance of fish stocking within Minden District, recognizing the cost of fish stocking and ensuring the wise use of this resource

Tactics:

- Maintain a 5 year Fish Stocking Plan
- Develop, within the framework of existing guidelines, a Minden District Fish Stocking Policy
- Public education, presenting the rationale for the District fish stocking policy
- Annually print and distribute the Fish Stocking List for the previous year

Strategy: Reduce the stress on sports fisheries caused by the introduction of competitor fish species (rock bass, smelt, perch, etc.)

Tactics:

- Inform the public of the negative impacts to the sports fisheries resulting from illegal introduction of competitor species
- Review private applications for live fish transfer, ensuring impacts to existing game fisheries will not occur
- Encourage removal of non-game competitor species by angling
- Removal of competitor species through Ministry of Natural Resources programs (i.e. netting, etc.)

Strategy: Ensure that water level control system are operated in a manner compatible with fisheries management

Tactics:

- Negotiate water level control agreements with those agencies administering the dams (Parks Canada, Orillia Light and Power and Ministry of Natural Resources Lands Branch)
- Public education program to identify the need for early fall stabilization of water levels on lake trout lakes, with an identified water level problem, and enlist public support
- Maintain a Ministry of Natural Resources fisheries representative (District Biologist) on the Haliburton County Water Level Committee

Strategy: Maintain and/or increase public access to the fisheries resource.

Tactics:

- Obtain written landowner agreements for all managed fisheries with public access over private property
- Inform the public as to the nature and importance of access agreement properties
- Establishment of access trails to inaccessible fisheries
- Ensure through the plan review process (ie. subdivisions, severences, etc.) that resource access is protected

Strategy: Develop a tactical plan to deal with acidification within Minden District

Tactics:

- Continue monitoring the rate of acidification through T.I.P. alkalinity determinations
- Encourage and support Ministry of Natural Resources acid precipitation research
- Develop a liaison with agencies involved in assessing acidifications impact and the effectiveness of various counteractive measures

Strategy: Expand the District bass (smallmouth and largemouth) production

Tactics:

- Introduction and establishment of self-sustaining bass fisheries to barren waters
- Encourage catch and release bass fisheries
- Maintain Nogies Creek fish Sanctuary as a source for future adult bass transfer stock

Strategy: To prevent the loss of the lake whitefish fisheries within the District

Tactics:

- Encourage further research in determining cause of whitefish decline
- Encourage removal of smelt
- Assess the effectiveness of regulatory changes to protect brood stock
- Continue not issuing whitefish dip-netting permits

Strategy: Develop a District Fisheries Enforcement Plan. Enforcement is an essential component of all aspects of fisheries management, from habitat protection to harvest control

Tactic:

- Establish enforcement priorities which reflect fisheries resource priorities (ie. lake trout being top priority)

Strategy: To increase management effort directed toward the commercial bait fish resource

Tactics:

- Encourage research to determine

allowable harvest levels for bait fish species
- Refine and assess the effectiveness of the current bait fish block management system
- Actively enforce commercial baitfish regulations ie. legal bait species and harvest/sale records
- Encourage bait fish rearing/harvest in waters unsuitable for game fish

Strategy: Assessing the effectiveness of innovative fisheries management techniques (Experimental Management)

Tactics:

- Cooperate with other agencies interested in carrying out relevant experimental programs within the Minden District
- Without enhancement funding no large scale experimental management programs will be initiated by Minden District

PUBLIC REVIEW

The Ministry of Natural Resources is committed to public consultation. Through it, the Ministry receives innovative ideas which can lead to more effective and efficient resource management. Moreover, public consultation can lead to decisions which resolve contentious problems and issues before rigid positions are reached.

Public response will be summarized in an appendix to the management plan.

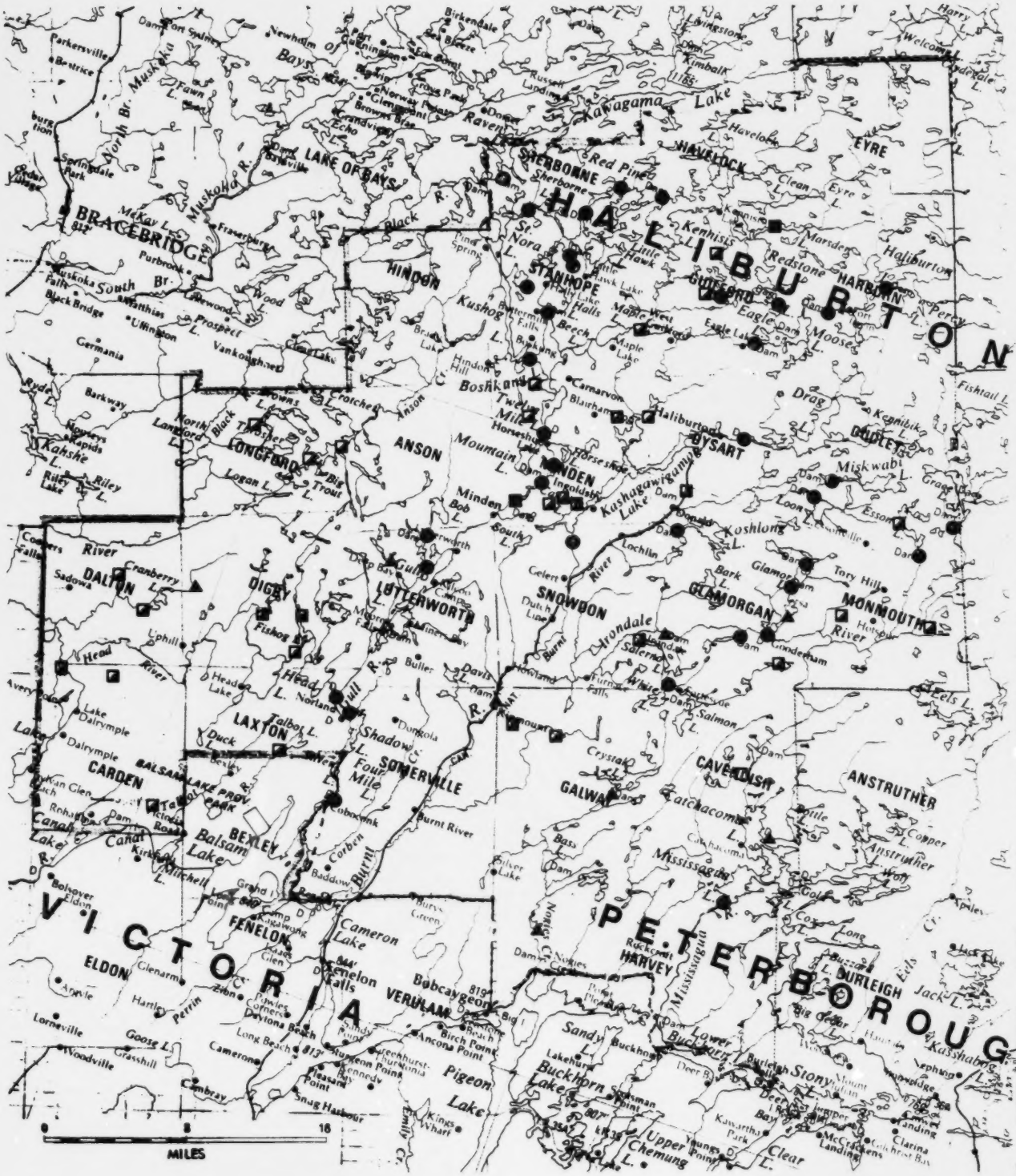
Please refer to the attached questionnaire which provides the opportunity for comment.

APPENDIX

FIGURE 4:

Ministry of Natural Resources
Ontario

MINDEN
ADMINISTRATIVE DISTRICT
ALGONQUIN REGION
DAMS



Parks Canada ●
M.N.R. ▲
Orillia Light & Power ■
Dams under Private Ownership ◘

SM 101 MD

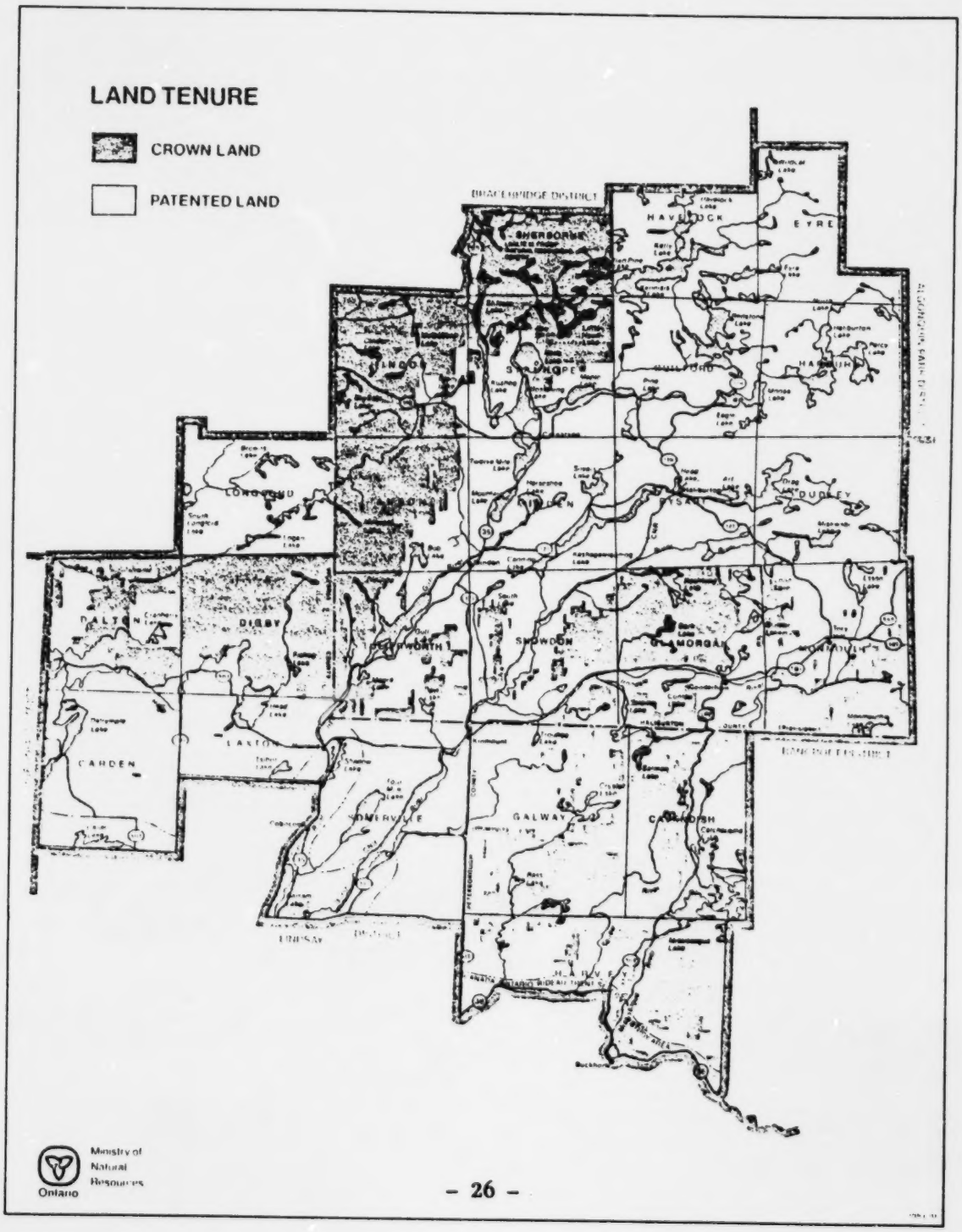
FIGURE 5:

MINDEN DISTRICT

MNR Administrative District
County
Township
Community
Provincial Highways
Railways

5 0 5 10 15 20 Kilometres
5 0 5 10 15 Miles

N



Ministry of Natural Resources
Ontario

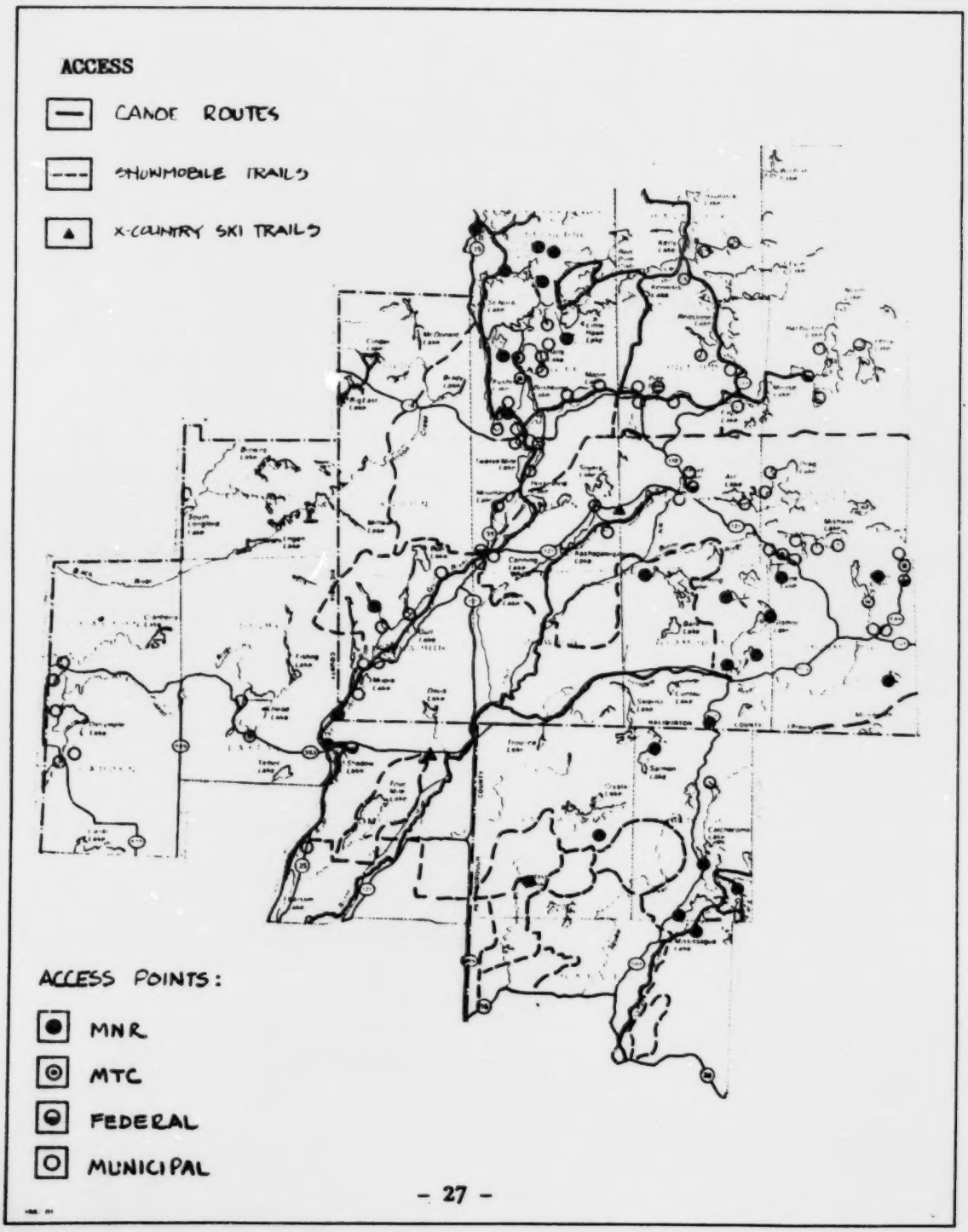
FIGURE 6:

MINDEN DISTRICT

M.N.R. Administrative District
County
Township
Paved Highways
Railways

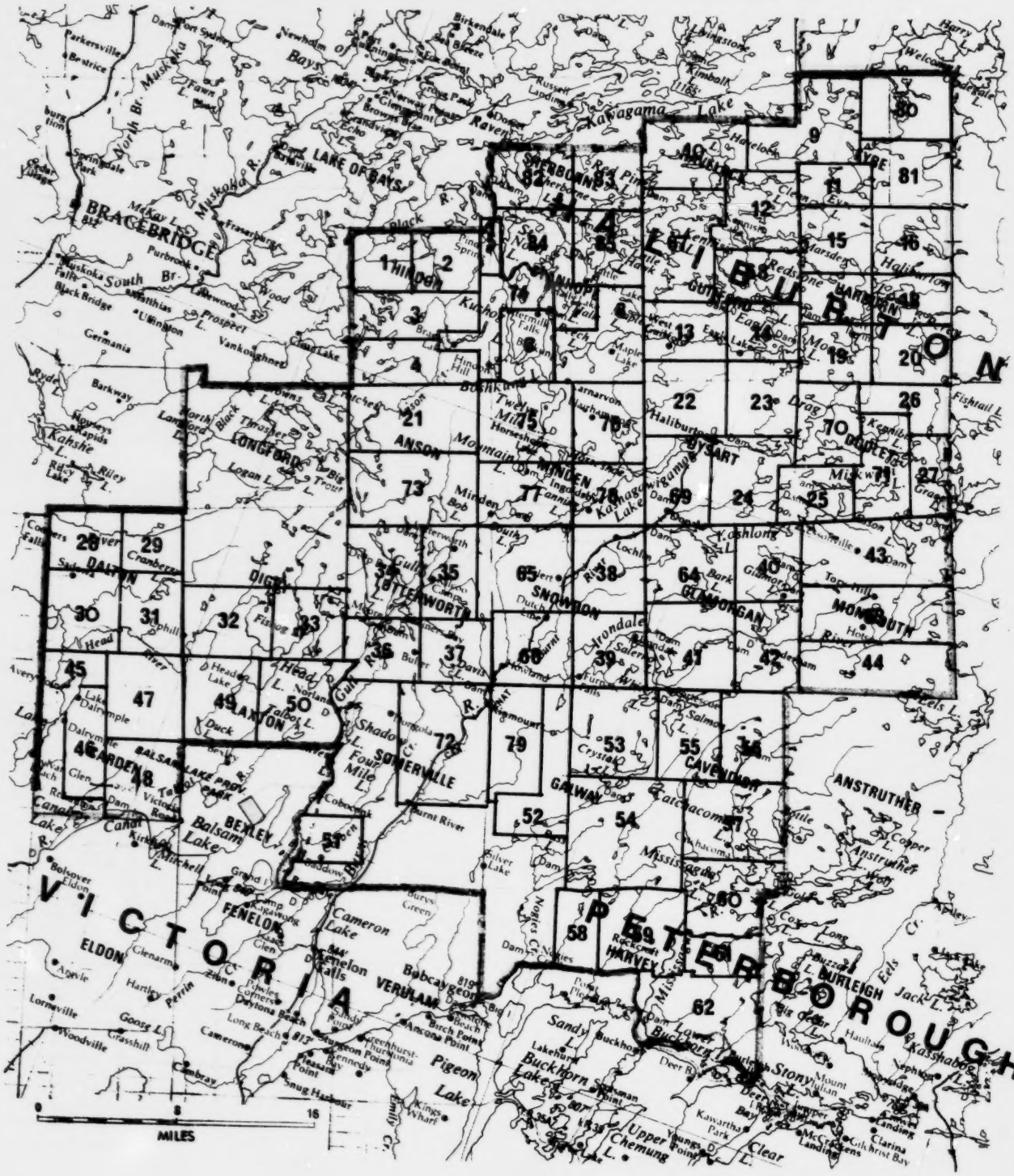
5 0 5 10 15 20 Kilometres
5 0 5 10 15 Miles

N



Ministry of Natural Resources
Ontario

FIGURE 7:
MINDEN
ADMINISTRATIVE DISTRICT
ALGONQUIN REGION
BAIT FISH LICENCING SYSTEM



SM 101 MD

FIGURE
MINDEN
DISTRICT

- M.N.R. Administrative District
- County
- Township
- Community
- Provincial Highways (35)
- Railways (CNR)

5 0 5 10 15 20 Kilometres

5 0 5 10 15 Miles

1: 250000

N

LAKE TROUT ▲

BROOK TROUT ●

RAINBOW TROUT ○

SPLAKE ★

BASS ■

MUSKELLUNGE / PIKE □

WALLEYE ▽

WHITEFISH / HERRING ✕✕

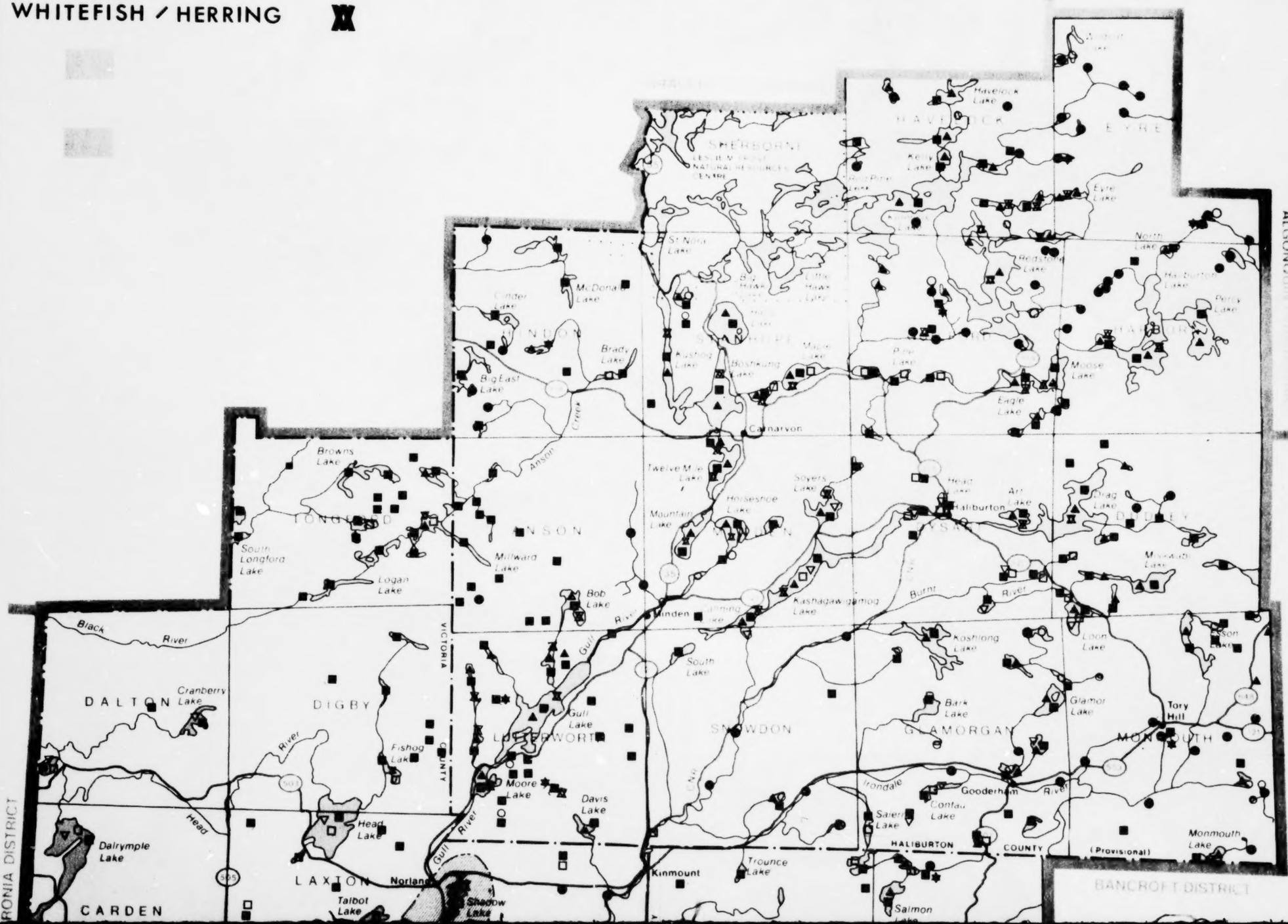
SPLAKE ★

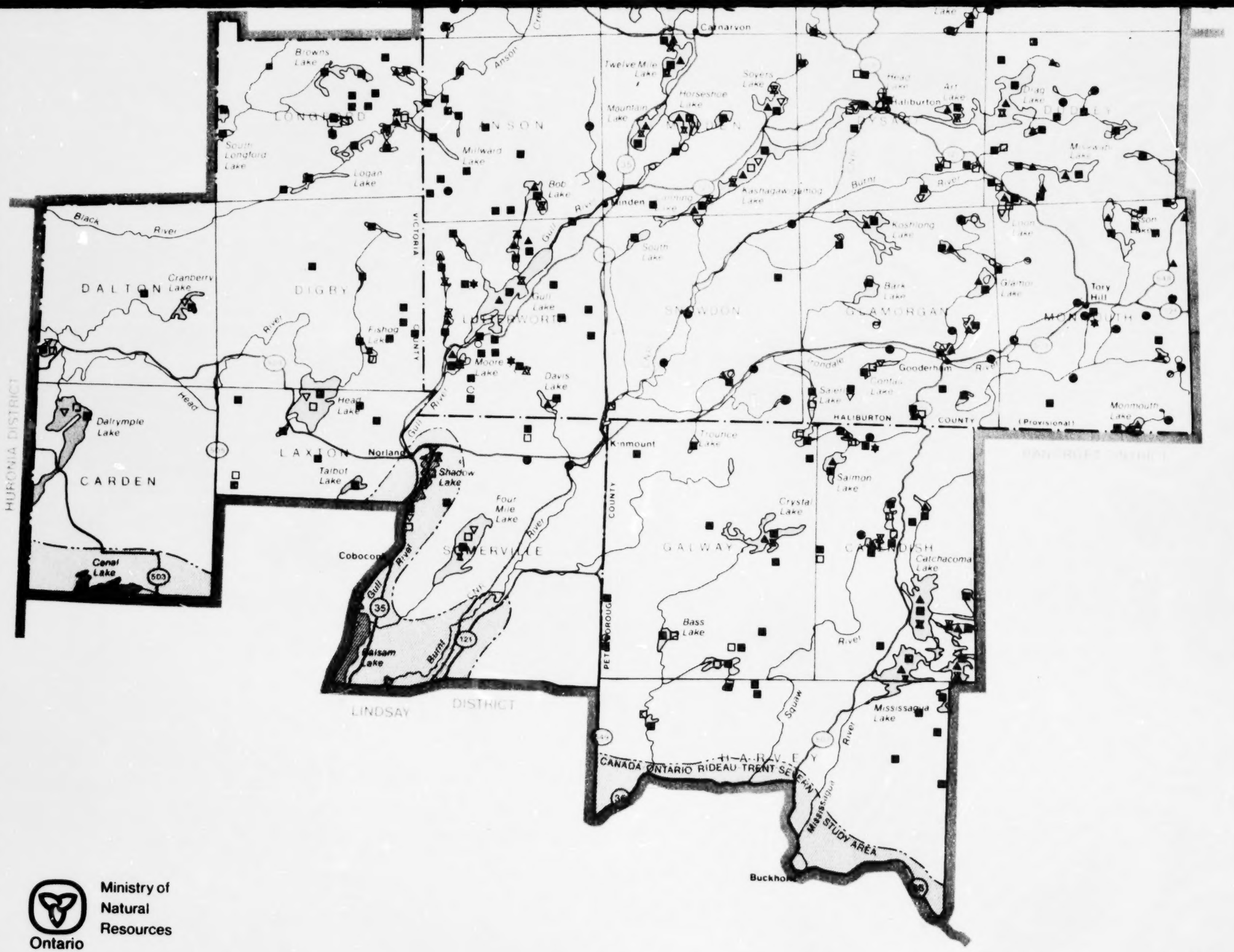
BASS ■

MUSKELLUNGE / PIKE □

WALLEYE ▼

WHITEFISH / HERRING ✖

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